

Glenn T. Seaborg Center Special Seminar

Effects of Ligand Environments on Uranium Reactivity Toward Carbon Dioxide and Other Heteroallenes

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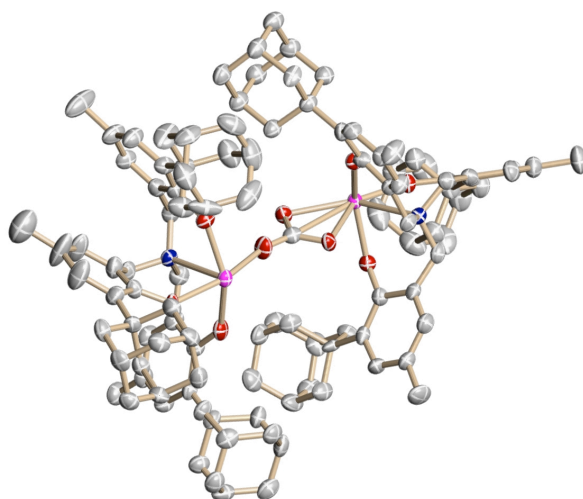
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2:00 - 3:00 pm

Building 70A, Room 3377

Hexadentate aryloxy substituted triazacyclononane ligand scaffolds (^RArO)₃tacn³⁻ (R = ^tBu and Ad) has provided access to reactive low- and high-valent uranium complexes. Activation of carbon dioxide was achieved with the sterically encumbered U(III) complex [$((^{\text{Ad}}\text{ArO})_3\text{tacn})\text{U}$] to form a complex containing a new linear coordination mode of CO₂ [$((^{\text{Ad}}\text{ArO})_3\text{tacn})\text{U}(\text{OCO}^-)$]. Modifications of the anchor fragment within the ligand provide other routes to carbon dioxide activation and functionalization. The U(III) complex bearing a tripodal ligand with single nitrogen anchor [$((^{\text{Ad}}\text{ArO})_3\text{N})\text{U}$] undergoes reductive splitting of carbon dioxide to form a bridging carbonate dinuclear complex [$((^{\text{Ad}}\text{ArO})_3\text{N})\text{U}_2(\mu\text{-CO}_3)$] (see figure below). Formation of the carbonate complex has been verified to proceed through a bridging oxo intermediate, [$((^{\text{Ad}}\text{ArO})_3\text{N})\text{U}_2(\mu\text{-O})$]. The reactivity of analogous μ -chalcogenido complexes [$((^{\text{Ad}}\text{ArO})_3\text{N})\text{U}_2(\mu\text{-E})$] (E = S, Se) are also investigated with CO₂ and CS₂.



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